

**DEMOSPONGIAE OF MINICOY ISLAND (INDIAN OCEAN)
PART 1 - ORDERS KERATOSIDA AND HAPLOSCLERIDA**

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ABSTRACT

Fortyone species of Demospongiae falling under 23 families and 32 genera collected from Minicoy Island during the years 1964 to 1970 are dealt with in this communication.

Since no information is available on the sponge fauna of Minicoy or the Lakshadweep in general in the faunistic Series edited by J. S. Gardiner during the years 1903 to 1906, it is hoped that the present account may serve as an addendum to the pioneering works on the Fauna and Geography of the Maldivian and Laccadive Archipelagoes.

In the present communication, the first in the series, descriptions of 11 species of sponges belonging to the orders Keratosida and Haplosclerida are presented in detail.

INTRODUCTION

THIS small collection of sponges from Minicoy (= Minikoi) Island is of great significance since it is a group which has been left out while dealing with the Fauna and Geography of Maldives and Laccadives (Gardiner, 1903). Since then several works have appeared from the other parts of the Indian Ocean region, but unfortunately, no advancement towards the study of the sponge fauna of Minicoy has been made. Hence, it was felt desirable to have a preliminary investigation of the fauna of Minicoy Island as a part of the general investigation of the sponge fauna of the Indian Seas initiated in 1964 under the guidance of Dr. S. Jones, former Director of the Central Marine Fisheries Research Institute, Cochin. About 11 species of Demospongiae have been collected from Minicoy Island and the systematics of the same formed a part of the Thesis presented by the author in 1968. Several collections of marine animals were subsequently made from Minicoy by the scientists of the Central Marine Fisheries Research Institute and the sponges collected by those who visited the island from time to

time are dealt with in this communication, which it is hoped may serve as an addendum to the faunistic series of the Maldivian and Lakshadweep Archipelagoes.

I take this opportunity to express my deep sense of gratitude to Dr. S. Jones, former Director of the Central Marine Fisheries Research Institute for his keen interest in the study of the sponge fauna of Minicoy Island and to Dr. E. G. Silas, Director of CMFRI for permitting me to publish this account. My thanks are also due to Dr. C. S. Gopinadha Pillai, Dr. K. K. Appukuttan and Dr. M. Alimanikfan of the C. M. F. R. I. for making an elaborate collection of sponges from Minicoy and to Dr. K. R. Radhakrishnan of the National Institute of Oceanography, Goa for secretarial assistance.

MINICOY ISLAND

The Lakshadweep and Maldivian Archipelagoes form a long, narrow, more or less continuous belt of islands and banks extending in a north-south direction located west of the southwest part of the Indian subcontinent. The Lakshadweep Archipelago (Fig. 1) starts at Lat. 14°N

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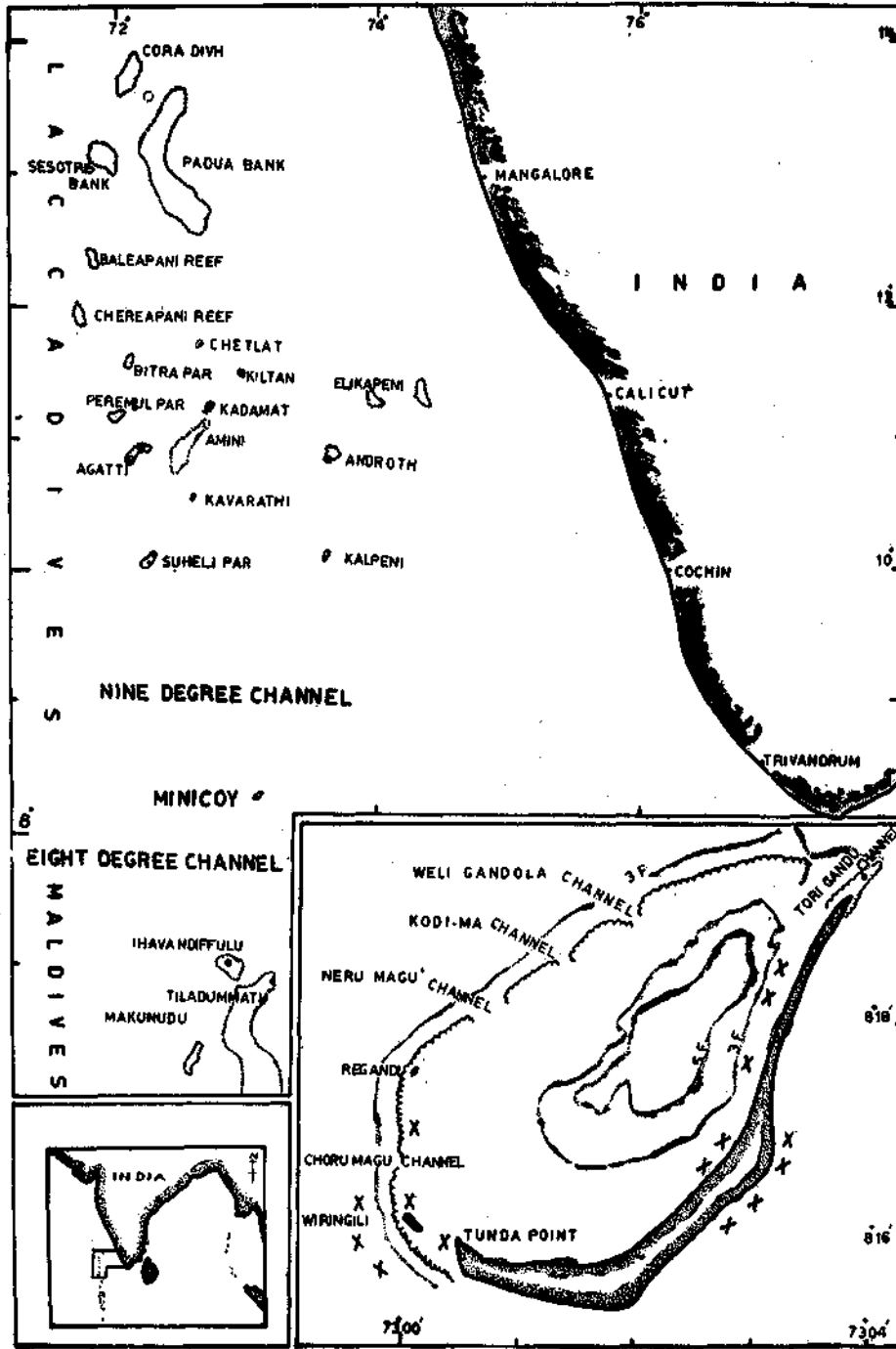


Fig. 1. The geographical position of the Lakshadweep and Maldivian Archipelagos (inset left) and the area marked highly enlarged (above). The details regarding Minicoy Island and the collection centres are shown in the inset map (bottom right).

and is formed of a series of isolated islands and banks. This is followed by the Maldive Archipelago at Lat. 7°10'N and thence embracing all large banks between Long. 72°30' and 73°40'E. The southern most island in this group is Addu Atoll at Lat. 0°40'S.

The bank of Minicoy, situated at Long. 73°E and Lat. 8°17'N occupies an isolated position, "does not belong much more to one Archipelago than the other" (Gardiner, 1903). It is about 344 km away from the nearest point in the Indian shore. The Nine Degree Channel separates Minicoy from Kalpeni and the Eight Degree Channel from Ihavandifolu (= Ihavandifulu) the most northern atoll of the Maldive Archipelago. Kalpeni and Ihavandifolu are situated at a distance of 112 and 192 km respectively from Minicoy.

The length of the Island is about 9.5 km and the width at its widest part, is about 650 metres. The atoll is oval in shape, elongated in north-east-southeast direction with a length of about 8 km. The atoll reef is interrupted by three channels *i.e.* Neru-Magu, Kandi-ma and Weli-Gandola towards the northeast of Regandi Island. Tori-Gandu Channel is at the northeast extremity. The reef extending from Tunda Point has two small islets - Wiringili and Regandi - on it. Between these two islets there is a small channel - Choru-Magu, constructed by removal of corals.

The lagoon has an area of about 10 sq. km and the depth ranges between 1 and 13 m. Shoals of corals are present at several places in the lagoon. The sponges were collected from different parts of the atoll and the various collection centres are given in Fig. 1.

In the present collection, there are 41 species referable to 32 genera under 23 families. Three species *viz.*, *Phyllospongia dendyi* (Lendenfeld), *Ciocalypa polymastia* (Lendenfeld) and *Clathria reinwardti* Vosmaer, are new records to

the Indian Ocean. Of these three, the details pertaining to the former two have already been published (Thomas, 1973 a). Only generic identification was possible in the case of three (*Agelas* sp., *Myxilla* sp. and *Bubaris* sp.) due to the lack of sufficient material. One species *Ecionemia thielei*, is reported here as new species.

The account on the sponge fauna of Minicoy Island is split up into 3 parts; the present first part deals with the Orders Keratosida and Haplosclerida (11 species), the second with the order Poecilosclerida (11 species) and the third includes orders Halichondrida, Hadromerida, Epipolasida and Choristida (21 species). The order Carnosida is not represented in the present collection. Some general remarks on the distribution of the various species collected are included in the last part. The references cited to in the next are given in the last part to avoid unnecessary duplication.

The general classification adopted here is that of de Laubenfels (1936) with minor modifications as suggested by him in a later paper (1948) and also in Hechtel (1965).

All dimensions are expressed in mm and a uniform pattern, lower limit, upper limit, mean in parenthesis, is followed uniformly. While citing the synonymy only important works are referred to and when an exhaustive synonymy is given in any such work, this is indicated by the word "synonymy" in brackets. Those numbered 'CMFRI-S' are deposited in the Reference Collection Museum of C.M.F.R. Institute at Mandapam Camp and others in the Goa Field Centre of C.M.F.R.I. at Panaji, Goa.

SYSTEMATICS

ORDER : KERATOSIDA Grant

Family : *Spongiidae* Gray

Spongia officinalis var. *ceylonensis* (Dendy)
(Fig. 2 a)

Euspongia officinalis var. *ceylonensis* Dendy, 1905, p. 211, Pl. 14, fig. 3, Pl. 16, fig. 5; Row, 1911, p. 380.

Spongia officinalis var. *ceylonensis* Burton, 1937, p. 39.

Material: A small piece measuring 10 x 16 x 18 mm (Reg. No. 1).

Description: Specimen only a bit of massive sponge. Surface highly conulose.

Colour: Black brown externally and pale yellow internally.

Consistency: Compressible with good resiliency.

Oscule 2 mm in diameter and with slightly elevated rim. Conules 0.5-2 mm high and 1-1.5 mm apart; sometimes compound.

Skeleton composed of coarse and irregular reticulation of pale amber coloured fibres. Primaries are cored with foreign objects and secondaries devoid of arenaceous objects. Diameter of primaries about 0.048 mm and that of secondaries 0.02 mm (Fig. 2 a).

Remarks: This is widely distributed "bath sponge" of Indian Seas.

Distribution: Red Sea, Indian Ocean.

Hyattella cribriformis (Hyatt) (Fig. 1 b)

Hyattella cribriformis de Laubenfels, 1948, p. 39. Thomas, 1973, p. 13, pl. 1, fig. 2 (Synonymy).

Material: One dry specimen (Reg. No. 2).

Description: Body tuberous, interior hollow and walls punctured by round openings. Thickness of wall about 1.5 mm.

Colour: Pale yellow when dry.

Consistency: Hard with poor resiliency when dry.

Oscules confined to tympanii, 1-3 mm in diameter. Surface conulose, conules distinct towards the growing tips.

Ectosome is semitransparent and detachable with arenaceous inclusions.

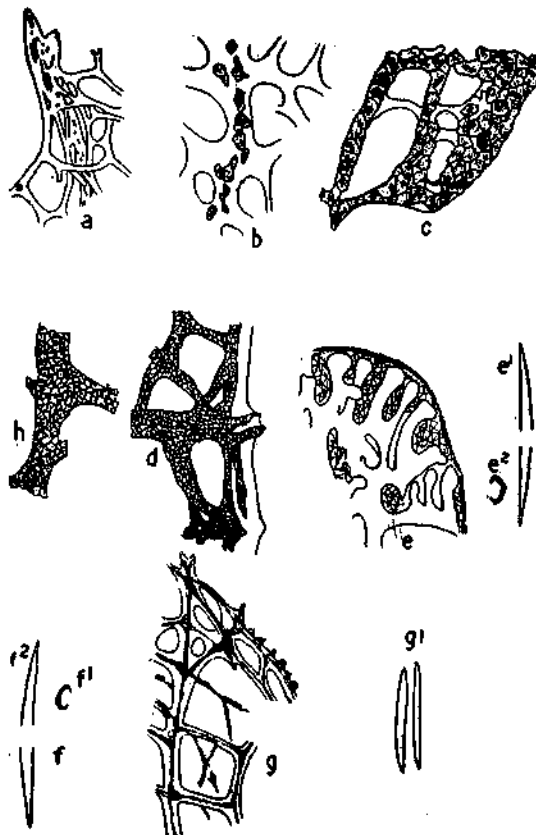


Fig. 2. Skeleton of : a. *Spongia officinalis* var. *ceylonensis*, b. *Hyattella cribriformis* c. *Phyllospongia foliascens*, d. *Dysidea herbacea* e. *Sigmadoxia fibulata* (e1. oxeas and e2. sigmas), f1, sigmas and f2. oxeas of *Sigmadoxia pumila*, g. skeleton of *Calyspongia diffusa*, g1. oxeas of *C. diffusa* and h. skeleton of *Dysidea fragilis*.

Skeleton consists of a well developed reticulation of main and connective fibres. The primary fibres are cored with arenaceous objects and connectives devoid of any. Diameter of primary upto 0.13 mm and that

of connectives from 0.01–0.06 mm. Fibres pale yellow in colour and meshes polygonal in shape (Fig. 1 b).

Distribution: Atlantic Ocean, Red Sea, Indian Ocean, Australian region.

Phyllospongia foliascens (Pallas) (Fig. 2 c)

Phyllospongia foliascens Bergquist, 1965, p. 131, figs. 3a, 3b (Synonymy); Thomas, 1973, p. 14, pl. 1, fig. 4, pl. 6, figs. 1, 2, 4 (Synonymy).

Material: 10 specimens (Reg. No. 3).

Description: Body cup shaped with concentric ridges or foliaceous branches arising from the inner part of the funnel shaped body. In some specimens the branches arising from the body may outgrow the funnel shaped part and form petaloid structures.

Colour: Sandy gray.

Consistency: Leathery.

The anatomy of this species is well described by Lendenfeld (1889) and systematic position by Bergquist (1965).

Ecological Notes: This species is abundant at the north eastern part of the lagoon and larger specimens are rather very common at this part. Foliaceous branches are commonly seen arising from the body of the specimens collected from this locality. Specimens collected from the reef where the wave action is quite severe, are smaller in size with a more robust appearance; concentric ridges are usually found in these specimens.

Distribution: Red Sea, Indian Ocean, Australian region, Pacific Ocean.

Phyllospongia dendyi Lendenfeld

Details regarding this species are presented by Thomas (1973 a),

Family : *Dysideidae* Gray

Dysidea fragilis (Montaga) (Fig. 2 h)

Dysidea fragilis Burton, 1934, p. 583, pl. 2, figs. 2-11 (Synonymy). Thomas, 1968, Ph. D. Thesis.

Material: Several specimens (Reg. No. 4).

Description: Body spherical to globular with finger shaped branches arising from the surface.

Colour: sandy gray and consistency, friable.

Surface highly conulose, conules 1–2 mm high and 1–3 mm apart. Oscules distributed irregularly in massive forms, but terminal on digitate forms.

Skeleton composed of coarse fibres charged with sand grains. Main fibres may measure upto 0.36 mm in diameter and end in surface conules. Connectives slender but densely cored. The reticulation become irregular in the interior.

Distribution: Cosmopolitan

Dysidea herbacea (Keller) (Fig. 2 d)

Dysidea herbacea Burton, 1934, p. 393 (Synonymy), Bergquist, 1965, p. 140, figs. 7a, b, c (Synonymy). Thomas, 1968, Ph. D. Thesis.

Material: Several specimens (Reg. No. 5).

Description: Body encrusting, with flattened branches growing vertically up to a height of 10 mm. At places these branches may also grow in crowded manner.

Colour: Dark gray.

Consistency: Fragile when dry.

Surface conulose, conules 0.2–1 mm high and 1–1.5 mm apart. Oscules and pores are not traceable.

The primaries and connectives are not differentiated from each other but both are equally cored with sand grains; diameter varies from 0.05–0.18 mm. Spongin scarcely visible.

Ecological Notes: Places where the wave action is severe specimens grow in thin film over the support. Symbiotic alga (*Phormidium spongeliae*) (Schulze) is found in the dermal part.

Distribution: Red Sea, Indian Ocean, Australian region, Pacific Ocean.

ORDER : HAPLOSCLERIDA Topsent

Family: *Adociidae* de Laubenfels

Sigmadocia fibulata (Schmidt) (Fig. 2 e)

Reniera fibulifera Carter, 1880, p. 48.

Gellius fibulatus Ridley, 1884, p. 424.

Sigmadocia fibulata Thomas, 1973, p. 21, pl. 1, fig. 9 (Synonymy).

Material: One specimen (Reg. No. 6).

Description: Body branching, branches finger shaped with serially arranged oscules. Oscules 2–2.5 mm in diameter. Pores rare; 0.025–0.04 mm in diameter.

Surface hispid due to the presence of symbiotic alga. Dermal skeleton consists of tangentially arranged oxeas and sigmas and are supported by bands of oxeas from the interior. Main skeleton composed of incomplete spicular fibres. Secondary meshes triangular with one side formed of one spicule. Spongin scarcely noted; if present, only at the corners (al - symbiotic alga).

Spicules: Oxeas (Fig. 1 e¹) slightly curved and sharply pointed. Size 0.115–0.218 (0.16 mm) x 0.003–0.008 (0.006 mm). Sigmas (Fig. 1 e²) with a notch at the centre. Chord length ranges from 0.012–0.021 (0.014 mm).

Ecological Notes: Symbiotic alga (*Ceratodictyon spongiosum* (Zanard) is seen associated with this specimen.

Distribution: Atlantic Ocean, Mediterranean Sea, Indian Ocean, Australian region.

Sigmadocia pumila (Lendenfeld) (Fig. 2 f)

Adocia pumila Burton, 1934, p. 537, pl. 1, figs. 1–9.
Burton, 1937, p. 20. Thomas, 1968 Ph.D. Thesis.

Material: One specimen (Reg. No. 7).

Description: Body finger shaped, with a terminal oscule.

Colour: Pale gray.

Consistency: Tough; slightly compressible.

Oscule terminal, diameter 3 mm; rim elevated and ornamental with conules.

Dermal skeleton is polygonal and the size and shape of meshes vary considerably. Oxeas may be seen in brushes also.

Spicules: Oxeas (Fig. 1 f²) slightly curved, size 0.11–0.211 (0.15 mm) x 0.002–0.013 (0.007 mm). Sigmas (Fig. 1 f¹) chord length varies from 0.012–0.018 (0.014 mm).

Distribution: Indian Ocean, Australian region.

Family: *Callyspongiidae* de Laubenfels

Callyspongia diffusa (Ridley) (Fig. 2 g)

Cladochalina diffusa Ridley, 1884, p. 672, pl. 41, fig. D.

Callyspongia diffusa Burton, 1934, p. 541, fig. 6 (Synonymy). Burton, 1959, p. 224 (Synonymy). Thomas 1968, Ph.D. Thesis.

Material: One specimen (Reg. No. 8)

Description: Specimen probably the terminal portion of an upright branch. Oscules

marginal, compound and serially arranged. These oscules are oval in shape with a greatest diameter of 2 mm.

Surface reticulate and conulose, conules 1 – 1.5 mm apart and 0.5 mm high. Colour, pale yellow and consistency hard.

Dermal skeleton consists of a well developed reticulation of multispicular fibres subdivided by uni or multispicular secondaries; all echinated by vertical tufts of oxeas.

Main skeleton is a coarse reticulation of multispicular fibres. The primaries emerge

at an angle to the surface and are connected by secondaries which are equally cored as the primaries. Main fibres are about 0.13 mm and connectives 0.07 mm in diameter (Fig. 2 g).

Spicules: 1) Oxeas (Fig. 2 g¹) - slightly curved and sharply pointed. Size 0.06–0.12 (0.09 mm) x 0.002–0.006 (0.004 mm).

Distribution: Indian Ocean, Australian region.

(Continued in Part 2)